

Rhodora

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NOTES ON PLANTS OF CENTRAL PENNSYLVANIA¹

HERBERT A. WAHL

It is the purpose here to record the occurrence of some plants in Central Pennsylvania which have not previously been reported from the state, or that reach a limit of their present distribution in this region, or that are otherwise noteworthy because of their distribution. Specimens of all the plants mentioned are deposited in the herbarium of The Pennsylvania State College and duplicates of most of those collected by the author have been distributed to other herbaria, including the University of Pennsylvania, Cornell University and The Gray Herbarium.

POTAMOGETON OAKESIANUS Robbins. In 1-2 feet of water in small pool in Oak Barrens at Scotia, 4 miles W. of State College, Centre Co., June 28, 1940. *Wahl* 758.

The determination has been checked by Ogden, who had seen no Pennsylvania specimens before the publication of his monograph². Well established at Scotia in shallow ponds and pools formed by iron-ore mining. Another sheet in the herbarium of The Pennsylvania State College labelled "Barrens Swamps Aug. 1857. *Lowrie*" was probably collected in Huntingdon County. It is here near the southern limit of its distribution, although it occurs also in the eastern part of the state.

P. NATANS L. Black Moshannon, 8 mi. E. of Philipsburg, Centre Co., July 4, 1921. *L. W. Nuttall*. Not recorded for Pennsylvania by Ogden (*loc. cit.*) but probably of more frequent occurrence than the reports indicate.

¹ Contribution from the Department of Botany, The Pennsylvania State College No. 145.

² RHODORA, 45: 57-105, 119-163, 171-216. 1943.

BROMUS CILIATUS var. *INTONSUS* Fernald. Wet meadow 1 mi. E. of Ridgeway, Elk Co., Sept. 6, 1940. *Wahl* 853. Dry clearing beside Black Moshannon Lake, 8 mi. E. of Philipsburg, Centre Co., Aug. 4, 1941. *Wahl* 1065. Stream-bank 5 mi. S. E. of Philipsburg, Aug. 18, 1941. *Westerfeld* 245. Roadside in woods 4½ mi. S. E. of Philipsburg, July 22, 1942. *Westerfeld* 1499. Not recorded for Pennsylvania by Hitchcock¹ but is of frequent occurrence especially in the northern counties.

B. JAPONICUS Thunb. var. *FORRECTUS* Hackel (See *RHODORA*, **43**: 529). In waste field at State College, Centre Co., June 11, 1942. *Wahl* 1309. Around stone-pile in hay-field 2½ mi. S. S. W. of Bellefonte, Centre Co., June 24, 1942. *Wahl* 1319. A relatively recent introduction. Pennsylvania records have been lacking.

GLYCERIA FERNALDII (Hitchc.) St. John (*G. pallida* var. *Fernaldii* Hitchc.). Moist soil around Black Moshannon Lake 8 mi. E. of Philipsburg, Centre Co., July 16, 1938. *Wahl* 190.

This is the only known Pennsylvania record and apparently the southernmost station for this plant of distinctly northern distribution. Since the collection in 1938, the station has been used extensively as a picnic ground. Recent search has failed to relocate the plant, so it is assumed to have been eradicated here.

G. BOREALIS (Nash) Bachelder. Growing in edge of water, pond at log-jam, Black Moshannon, Centre Co. *Nuttall*, July 18, 1921. The only other report for this species in Pennsylvania is one listed as doubtful by Gress².

ERAGROSTIS POAEOIDES Beauv. Waste place near C. C. C. camp S-103, Laquin, Overton Twp., Bradford Co., Aug. 1, 1942. *Westerfeld* 1187. Not listed for Pennsylvania by Hitchcock¹ but occurs also in other places in the eastern part of the state.

CALAMAGROSTIS PORTERI A. Gray. Woods ¾ mi. S. of Warriors Mark, Huntingdon Co., *Lowrie*, Aug. 21, 1865. Open woods 2 mi. E. of Coburn, Centre Co., *Wahl*, July 8, 1933.

The distribution and identity of *C. Porteri* and its close relatives have been admirably discussed by Father Louis-Marie³, who also has verified the determinations of the above collections. The Huntingdon County station is approximately 10 mi. north of Porter's original station near Alexandria, while the Centre County station is about 70 miles N. E. Gress⁴ also reports it

¹ Manual of the Grasses of the United States. U. S. Dept. Agric. Misc. Pub. No. 200. 1935.

² The Grasses of Pennsylvania. Bur. Pl. Ind. Gen. Bul. 384. Harrisburg, Pa. 1924.

³ *RHODORA*, **46**: 285–305. 1944.

⁴ The Grasses of Penna., Bur. Pl. Ind. Gen. Bul. 384. Harrisburg, Pa. 1924.

from Blairs Mills, Huntingdon County, about 50 miles S. E. of Alexandria and from Lackawanna and Monroe Counties in Northeastern Pennsylvania. These additional stations help to fill in the Alleghenian distribution of this rare grass.

AGROSTIS PERENNANS forma *CHAETOPHORA* Fernald. 2 mi. N. W. of Petersburg, Huntingdon Co., Sept. 21, 1941. *Wahl* 1164. 8 mi. N. of McAlevys Fort, Huntingdon Co., Aug. 18, 1943. *Wahl* 1389. Two other sheets from Huntingdon County and two collections by Nuttall from near Philipsburg in Centre Co., show this awned form of *Agrostis perennans*, described by Fernald¹ from Huntingdon Co., to be fairly common in the mountainous parts of Huntingdon and Centre Counties.

A. PERENNANS var. *AESTIVALIS* Vasey, forma *ATHEROPHORA* Fernald. "Allegheny Mt." Sept. 1873. *Lowrie*. (Probably Huntingdon or Blair Co.) Described by Fernald³ from Quebec and not otherwise reported. Most of the above were originally labeled *A. canina*.

PANICUM LEIBERGII (Vasey) Scribn. Limestone outcrop along railroad at west edge of State College, July 10, 1941. *Wahl* 1035A.

The colony consists of only a few plants which have persisted in a healthy and vigorous condition, but without spreading, since their discovery. The only known record for Pennsylvania.

CAREX FESTUCACEA Schkuhr. Open woods at Ingleby, 2 mi. E. of Coburn, Centre Co., June 13, 1934. *Wahl*. Fairly abundant at this locality, the only station known to the author in central Pennsylvania.

C. RICHII (Fern.) Mackenzie. Ashy spot in acid marshy meadow at Avis, Clinton Co., June 3, 1938. *Wahl* 119. The only station known to the author in central Pennsylvania. Sporadic in its distribution. Listed from several counties by Bright².

C. STRAMINEA Willd. Edge of small temporary pool 4 mi. W. of State College. June 22, 1937. *Wahl*. Edge of dried-up waterhole 4 mi. N. W. of State College. July 1, 1941. *Wahl* 1034.

The distribution of this species given by Mackenzie³ as being chiefly coastal adds significance to central Pennsylvania stations although it is a rare sedge here. Listed also by Bright² from several western counties.

¹ *RHODORA*, 35: 317. 1933.

² *Trillia*, 9: 1-33. 1925-1930.

³ *Cyperaceae in North American Flora* 18: (part 3) p. 163. 1931.

C. AENEA Fernald. Very dry gravelly bank 3 mi. N. of Lock Haven, Clinton Co., May 28, 1931. *Wahl*.

When the above specimen was collected it was placed in the herbarium under *C. foenea* Willd. (*C. argyrantha* Tuckerm.) and so remained until 1940 when its identity as *C. aenea* was suspected by the author and confirmed by Professor Fernald. The material was taken from a single large plant growing on what was then a newly formed roadside fill. A brief visit to the station in June, 1940, failed to relocate the plant, but further search is necessary to determine if the species is still present so far removed from its nearest reported stations in New York and Connecticut.

C. GEYERI Boott.

The local occurrence of this sedge, not otherwise known east of Colorado, was reported by Clausen and Wahl¹. Its local distribution has now been determined as extending over an area approximately 4 miles long by $\frac{1}{2}$ mile wide where it is chiefly confined to wooded areas on the north-west-facing slope of a valley, usually near limestone outcrops. It is especially abundant where white pine occurs intermixed with the hardwoods. It has every appearance of being indigenous to the area.

C. SPRENGELII Dewey. In shallow soil at top of shaded rocky outcrop $\frac{1}{2}$ mi. N. W. of State College. May 23, 1943. *Wahl* 1348. The only station known in this part of the state but present also in eastern counties.

JUNCUS BALISTICUS Willd. var. LITTORALIS Engelm. Marshy meadow 1 mi. E. of State College. July 24, 1931. *Wahl*.

This characteristic plant of brackish shores here grows in a small dense colony in a distinctly calcareous marsh associated with *Carex prairea*, *C. Schweinitzii*, *C. hystricina*, etc. Of sporadic distribution in the state, but here near its southern limit. Known also from Erie Co. (Presque Isle), Lehigh and Lancaster Counties.

STELLARIA CALYCANTHA var. ISOPHYLLA (Fernald) Fernald². Stream-bank, 5 mi. S. E. of Philipsburg, Centre Co., May 27, 1941. *Westerfeld* 358.

S. CALYCANTHA var. FLORIBUNDA (Fernald) Fernald². Wet place along Wallace Run 4 mi. N. of Unionville, Centre Co., June 2, 1941. *Wahl* 986.

¹ RHODORA, 41: 28-34. 1939.

² RHODORA, 42: 254-259. 1940.

These varieties are here at or near the southern limit of the distribution of the species.

HOLOSTEUM UMBELLATUM L. In cultivated field at State College, May 17, 1943. *Wahl* 1344. The first collection of this weedy species from the local area.

ERUCASTRUM GALLICUM (Willd.) Schultes. In corn-field at State College, October 6, 1941. *Wahl* 1226. Likewise the first local record of this weedy species which is becoming widely distributed.

LESPEDEZA STIPULACEA Maxim. In field not cultivated for several years, 3 mi. S. of Centre Hall, Centre Co., October 5, 1940. *Wahl* 897.

L. CUNEATA (Dumont) G. Don (*L. sericea* Miq.). In field not cultivated for several years 5 mi. N. W. of State College, October 8, 1941. *Wahl* 1248.

Both of the above species of *Lespedeza* are plants that are grown for forage and have become established in the fields where they occur but have not spread. Both constitute the first and only known records for the species from this area. The author is indebted to the late Dr. K. M. Wiegand for the determination of the former and to Dr. F. J. Hermann for the latter.

HYPERICUM GYMNANTHUM Engelm. & Gray. Edge of dried-up pool in Oak Barrens 2 mi. N. W. of State College, August 17, 1938. *Wahl* 113.

This isolated colony, the only known local station, possibly represents the northernmost point of distribution for this species.

LONICERA VILLOSA var. *TONSA* Fernald. Marsh at Black Moshannon, 8 mi. E. of Philipsburg, May 8, 1941. *Wahl* and *Sinden* 927 and 928, also 1033, July 1, 1941.

This shrub reaches the southern limit of its distribution in Pennsylvania, where it is known from Warren and Monroe Counties in addition to the above station in Centre County. The Centre County plants differ from the description of var. *tonsa* in having some of the branchlets pilose.

The locality around Black Moshannon is noteworthy because of the occurrence here of several plants of distinctly northern distribution. Those mentioned in this paper as here reaching or approaching the southern limit of their present range are *Glyceria Fernaldii*, *Glyceria borealis* and *Lonicera villosa* var. *tonsa*. Also present are such plants of boreal affinities as *Rhamnus alnifolia*, *Sanguisorba canadensis*, *Poa saltuensis*, *Dalibarda repens* and

Cornus canadensis. The locality is on the Allegheny Plateau, about three miles from its south-east edge, at an altitude of about 1880 feet.

EUPATORIUM ALTISSIMUM L. Dry bank 2 mi. W. of Spring Mills, Centre Co., August 6, 1939. Wahl 330. Dry roadside 1 mi. W. of Spring Mills, September 3, 1939. Wahl 419. The only stations known in Central Pennsylvania and here at or near its northern limit. Occurs sparingly in the S. E. part of the state.

GRINDELIA SQUARROSA VAR. SERRULATA (Rydberg) Steyermark. Dry roadside 4 mi. N. E. of Bellefonte, Centre Co., July 30, 1941. Wahl 1047. A western species locally and sparingly introduced in the east. The only other Pennsylvania record for this variety is from Erie County.¹

ASTER LUCIDULUS (Gray) Wiegand. Moist soil along stream at Oak Hall, September 10, 1939. Wahl 443. Marshy place along stream at Linden Hall, September 25, 1939. Wahl 526. Wet field along stream $\frac{1}{2}$ mi. E. of Lemont, September 27, 1941. Wahl 1200B. Fairly abundant along about $4\frac{1}{2}$ miles of the upper reaches of Spring Creek between Lemont and Linden Hall in Centre County. The only known Pennsylvania records for this more northern species.

CARDUUS ACANTHOIDES L. Dry field at Oak Hall, Centre Co., September 25, 1941. Wahl 1200. Quite abundant at this station and with scattered patches extending about five miles northeast. Occurs sparingly in the eastern part of the state.

THE PENNSYLVANIA STATE COLLEGE

HAIRY VARIETY OF SWEET PIGNUT IN NEW ENGLAND.—*Carya ovalis* (Wang.) Sarg. var. *hirsuta* (Ashe) Sarg. (see Sargent, C. S., Bot. Gaz. **66**: 247, 1918) has been collected in several localities near Northampton, Mass., and on Meetinghouse Hill, Winchester, New Hampshire. This variety differs from the other varieties or forms of the species in having the rachis and often the lower surface of the leaflets densely pubescent, some of the hairs fascicled, others single. Several features vary as in the species as a whole. Thus, the leaflets range from 5 to 7; the fruit is quite diverse in shape and size, in the amount of splitting of the husk, and in the roughness of its surface; the bark varies from scaly to tight. The fruit on some trees approaches that of *C. glabra*. This variety is probably found locally throughout much

¹ Ann. Mo. Bot. Gard. **21**: 483. 1934.



Photo. B. G. Schubert.

RUELLIA SUCCULENTA: FIG. 1, portion of flowering plant, $\times \frac{2}{5}$; FIG. 2, fruiting branch, $\times 1$; FIG. 3, summit of internode and bases of leaves, $\times 4$; FIG. 4, lower surface of leaf, showing cystoliths, $\times 10$; FIGS. 5 and 6, median and terminal flowering nodes, $\times 1$; FIG. 7, calyx and fruit, $\times 2$



Photo, B. G. Schubert.

RUELLIA NOCTIFLORA: FIG. 1, base of plant, $\times 1$; FIGS. 2, 3 and 4, flowering tips, $\times 1$ (FIG. 3, ISOTYPE); FIG. 5, summit of internode and bases of leaves, $\times 4$; FIG. 6, calyx and capsule, $\times 2$

of the range of the sweet pignut in eastern United States from the place of original description in North Carolina to New Hampshire. It might be confused vegetatively with *C. ovata* and *C. tomentosa* (*C. alba*) in New England, and with *C. pallida* in the southeast. The subapical tufts of hairs on the serrations of the leaflets (see Manning, Amer. Jour. Bot., supplement Dec. 1942, p. 13s) and the persistent coriaceous dark outer bud-scales of the longer terminal buds are distinctive for the shagbark. The hairy twigs, the definitely separated fascicles of quite curly hairs on the rachis, giving this a shaggy appearance, the constantly fascicled hairy lower leaflet-surface, the stout branchlets, and the large buds distinguish the mockernut. The pale hickory differs only in the clearly separated fascicles of curly hairs on the rachis together with the pale and, except for the midrib, glabrous lower surfaces of the leaflets. A paper giving distribution, notes, and a key will be published later.—WAYNE E. MANNING, Northampton, Mass.

PEREZIA ALETES AN ARGENTINIAN SPECIES.—In RHODORA, xx. 151 (1918), *Perezia aletes* Macbride was described as a new species, casually adventive from somewhere, found in 1917 as a garden-weed in North Worcester, Massachusetts. It has not been subsequently reported; furthermore, Dr. I. M. Johnston has, correctly it would seem, identified the specimen with *P. sonchifolia* Baker, a characteristic species of Argentina. Unless it subsequently appears to have got a real foothold, the species can be considered only a temporary and casual adventive.—M. L. FERNALD.

RUELLIA IN THE EASTERN UNITED STATES

M. L. FERNALD

(Continued from page 38)

In northwestern Florida there occurs a localized variety which differs from wide-ranging *Ruellia ciliosa* in suppression of the pubescence, the internodes being merely cinereous-puberulent, and the calyx-segments, though long-ciliate, covered on the back with cinereous pulverulence. This should be called

Var. **cinerascens**, var. nov., caulis internodiis cinereo-puberulis; calycis laciniis dorso cinereo-pulverulentibus margine villosociliatis.—NORTHWESTERN FLORIDA: WALTON CO.: dry open woods, Crestview, July 22, 1899, A. H. Curtiss, no. 6489 in part, distrib. as *R. humilis* (Mo, NY, US (TYPE in U. S. Nat. Herb.)). ESCAMBIA CO.: Fisherville, near Pensacola, June 17, 1905, J. M. Macfarlane (Pa).

8. R. **SUCCULENTA** Small. Erect or nearly so, with simple hollow and fleshy stems or erect branches 1.5–7.5 dm. high, the internodes sparingly puberulent or generally glabrous, purplish: leaves succulent, purplish, oblanceolate, narrowly obovate or oblong, narrowed to definite petioles, glabrous or minutely hirtellous and glabrate, undulate, the surfaces more or less lineolate; larger blades 3–6 cm. long and 0.7–2 cm. wide: flowers 1–3 on very short glabrous axillary peduncles: bracts small, lanceolate or oblong, glabrous: calyx-segments linear-filiform, 1–2 cm. long, glabrous or sparsely ciliate: corolla blue-purple, 2.5–4.5 cm. long, or the latest ones smaller; the slender tube 1.5–2.5 cm. long, the slenderly campanulate throat 0.7–1 cm. in diameter at summit, the expanded limb 2.5–4 cm. broad: capsule glabrous, rarely strigose, 1–1.5 cm. long, longer or slightly shorter than calyx.—Bull. N. Y. Bot. Gard. iii. 437 (1905).—Everglades region of southern FLORIDA: DESOTO CO.: sandhills, Avon Park to Sebring, Small & DeWinkeler, no. 9047 (NY). LEE CO.: hammocks, Myers, Hitchcock, no. 261. DADE CO.: border of wet prairie, Bay Biscayne, A. H. Curtiss, no. 5500E; near Cutler, A. A. Eaton, no. 257; in everglades near unfinished railroad grades, between Coconut Grove and Cutler, Small & Carter, no. 1721 (ISOTYPES); northwest of Perrine, Small & Carter, no. 2999; west of Perrine, Small, no. 7880; west of Peters, Small, nos. 7917 (NY) and 7923 (NC, NY, Pa); between Peter's Prairie and Homestead, Small & Carter, no. 2702 (NY); glade, Black Point Bridge, below Cutler, J. P. Young, no. 319 (US); hammocks, Black Point, Small & Carter, no. 1101 (NY); pine-lands, Large Island, east of Naranja, Small & Carter, no. 3070 (NY); pinelands about Sykes Hammock, Small, Mosier & Small, no. 5659 (Duke, NY); hammocks on prairie east of Florida City, Small, no. 8080 (NY); near the Homestead Trail, Small, no. 2256 (NY); west of Camp Jackson, Small & Wilson, no. 1844 (NY); Camp Jackson to Camp Longview, Small, Carter & Small, no. 3490 (NY); Paradise Key and vicinity, Safford & Mosier, no. 207 (US). MONROE CO.: everglades, intersecting Long Key, Small & Carter, no. 3017 (NY). PLATE 851; MAP 7.

In its stiffly upright habit, glabrescent and more or less fistulous stems, fleshy purplish leaves and relatively short calyx *Ruellia succulenta* is not likely to be confused with more northern species.

Small contrasted it with *R. "parviflora"*, but that name, as currently used, applies to as diverse an aggregation of plants as can be imagined, the name, as originally applied, belonging to nothing readily identifiable. In some characters, especially in habit and foliage *R. succulenta* might, superficially, be mistaken for the next.

9. *R. NOCTIFLORA* (Nees) Gray. Stems erect or arched-ascending (rarely divergently branching from base—presumably after injury), 1.5–6 dm. high, cinereous-puberulent or minutely cinereous-pilose, glabrescent, with elongate internodes and 3–10 pairs of leaves on main axis: leaves narrowly lanceolate to lance- or elliptic-oblong, submembranaceous, puberulent or minutely hirtellous, tapering to blunt or subacute apex and to sessile to short-petioled base, undulate; the larger ones 3–8 cm. long and 0.8–2.7 cm. broad: peduncles solitary in axils of 1–4 upper pairs of leaves, very short, cinereous-puberulent; the 2 cinereous bracts linear-lanceolate and undulate-dentate: calyx-segments slenderly linear, cinereous-puberulent or minutely hirtellous, 2.5–4.5 cm. long: corolla bluish to nearly white, expanding in the night, 6–11 cm. long; slender tube 4.5–8 cm. long; the slender throat only 1–2 cm. long and 5–10 mm. thick; the expanded limb 3.5–6 cm. broad: capsule cinereous-puberulent, 2.25–3.5 cm. long.—Syn. Fl. N. Am. ii¹. 326 (1878). *R. tubiflora* LeConte in Ann. Lyc. N. Y. i. 142 (1824), not HBK. (1817). *Dipteracanthus noctiflorus* Nees in DC. Prodr. xi. 123 (1847) in part, *i. e.* the typonym *Dizygandra tubiflora* Shuttleworth in Pl. Rugel in herb., and the citation of *R. tubiflora* LeConte and LeConte's material, not the other citations.—Savannas and wet pine barrens, evidently local, eastern Georgia to northwestern Florida, west to southwestern Louisiana. GEORGIA: WITHOUT STATED LOCALITY: *LeConte* (Mo, NY); savannas, *LeConte?* (Phil); these perhaps portions of the original collections, at first called *R. longiflora* (not *R. longiflora* Richard, 1792) but on some sheets altered to *R. tubiflora*, *LeConte* in his publication saying: "Inhabits in the savannahs of the Altamaha". RICHMOND CO.: "Altamaha, Bath", *LeConte* (Phil). LIBERTY CO.: near Sunbury¹, *LeConte* (NY); wet peaty pine barrens, 14 miles southeast of Ludowici, *Wiegand & Manning*, no. 2928 (erroneously noted as from "Long Co."). MCINTOSH CO.: at sea-level, about Darien Junction, June 25–27, 1895, *J. K. Small* (NY). FLORIDA: WITHOUT STATED LOCALITY: Florida, *LeConte* (Phil); Florida, *Chapman*, several collections (Mo, NY, Phil, US); West Florida, *Chapman*, several collections. WAKULLA CO.: "*Dizygandra noctiflora* Shuttl. n. sp.", In campis graminosis,

¹ Sunbury, not found on modern maps of Georgia, was thus described in Lippincott's Gazeteer (1856): "a decayed town of Liberty co., Georgia, on the Medway River, about 30 miles S. S. W. of Savannah".

inter St. Marks et Port Leon, Florida, legit *Rugel*, Jun. 1843 (Mo, NY), ISOTYPES of *Dipteracanthus noctiflorus* Nees. FRANKLIN CO.: Apalachicola, Chapman, with note, "The flowers open in the night and fall off by morning"; low prairie, Apalachicola, 1867, B. F. Saurman; low, grassy pine barren, Apalachicola, Chapman, distr. by Biltmore Herb., no. 4501^a; low pinelands, Port St. Joe to Apalachicola, Small, Small & DeWinkeler, no. 11,417 (NY, US). ALABAMA: low meadows on the coast, Portersville, Sept., 1892, Mohr (US)—locality not definitely located, since Portersville in DeKalb County is not on the coast. CULLMAN CO.: Cullman, June 22, 1897, Eggert (Mo). MOBILE CO.: grassy pine meadows near the coast, Bayou Labatre, Aug. 13, 1892, Mohr (NY, US). MISSISSIPPI: Deer Island, A. B. Seymour, no. 197 (loosely branched, presumably injured, the rameal leaves with unusually long petioles). HARRISON CO.: Biloxi, June 22, 1899, S. M. Tracy, some specimens as no. 6500 others as no. 4948 (Mo, NC, NY, US). HANCOCK CO.: pine barren, Woodson & Schery, no. 51 (Mo); Bay St. Louis, Ingalls (NY). LOUISIANA: CALCASIEU PARISH: vicinity of Lake Charles, 1904, Andrew Allison (US). PLATES 852 and 853; MAP 8.

Ruellia noctiflora is one of the most distinctive and, at the same time, highly localized American species. In view of the great amount of collecting in the Southeastern States, it should, if at all common, be better represented in herbaria. LeConte's statement, when he originally published it as *R. tubiflora*, that it "Inhabits in the savannahs of the Altamaha", suggest localization. When he renamed the species *Dipteracanthus noctiflorus*, Nees, as usual, had very mixed ideas, for he included with the LeConte plant and that from St. Marks, Florida, material from Texas of the wholly different *R. humilis* Nutt.; in fact he made *R. humilis* a variety of *D. noctiflorus*, and he went so far in his general misinterpretations as to note that the wonderfully different *Dipteracanthus noctiflorus* "vix a *D. cilioso* Purshii differret". Aside from the minutely canescent pubescence which covers most parts of *R. noctiflora*, this species has the longest corolla and calyx of any of our species, and its very long (up to 3.5 cm. long) capsule is cinereous-puberulent.

10. *R. HUMILIS* Nutt. Stem often at first simple, soon with arched-ascending to horizontally divergent or reclining branches; the main axis 1-7 (-8.5) dm. high; the rather short internodes villous-hirsute or canescent-pilose to glabrescent, quadrate, with 4-12 pairs of leaves longer than the internodes, and 4-10 nodes floriferous; leaves coriaceous, often hirsute to villous on



Photo. B. G. Schubert.

RUELLIA NOCTIFLORA: FIG. 1, summit of flowering stem of probable TYPE of *R. tubiflora*, $\times 1$; FIG. 2, fruiting summit, $\times 1.8$; FIG. 3, bract, calyx-segment and base of capsule, $\times 10$; FIG. 4, surface of capsule, $\times 10$



Photo, B. G. Schubert.

RUELLIA HUMILIS, var. TYPICA: FIG. 1, TYPE OR ISOTYPE, $\times 1$; FIG. 2, summit of primary axis, $\times 1$; FIG. 3, calyces and capsules, $\times 2$

nerves and margin, oblong or oblong-lanceolate to ovate, sessile or subsessile, nearly uniform or but slightly reduced upward; flowers few in the axils: bracts lanceolate, oblong or elliptic: calyx-segments 1.5–2.5 cm. long, linear-attenuate, mostly hirsute- to villous-ciliate: corolla 2–8 cm. long, lavender to bluish (rarely white), the slender tube 0.7–5 cm. long, the throat campanulate; corolla reduced, closed and tubular in rare cleistogamous individuals: capsule glabrous, 1.2–1.5 cm. long: seed suborbicular, 3–4 mm. in diameter.—A wide-ranging polymorphous species, of which the following are the more significant varieties.

- a. Younger internodes of stem copiously villous-hirsute to canescent-pilose or -puberulent; larger leaves 3–8 cm. long, their veins and margins usually villous-ciliate.... b.
- b. Corolla 3–4.5 (–5) cm. long, its slender tube 1.2–2.5 cm. long.
 - Larger leaves of main axis elliptic-oblong to oblong-lanceolate, 1–2.5 cm. broad, obtuse to subacute. Internodes of stem copiously villous-hirsute with long divergent hairs..... 10a. Var. *typica*.
 - Internodes canescent-pilose or -puberulent, with no or but few scattered long hairs..... 10b. Var. *typica*, forma *grisea*.
 - Larger leaves of main axis ovate to oval-oblong or broadly elliptic, 2–4 cm. broad, mostly rounded at summit; stems strongly spreading-villous..... 10c. Var. *frondosa*.
- b. Corolla 5–8 cm. long, its slender tube 3–5 cm. long; internodes of stem more or less villous-hirsute.
 - Larger leaves of main axis elliptic-oblong to oblong-lanceolate, 1–2.5 cm. broad, obtuse to subacute. 10d. Var. *longiflora*.
 - Larger leaves of main axis ovate-oblong to broadly oval, rounded at summit, 2.5–4 cm. broad..... 10e. Var. *expansa*.
- a. Younger internodes of stem glabrous, glabrescent or with only few scattered hairs on the angles; leaves glabrous, glabrescent or only sparsely short-hirsute on nerves beneath and margin, narrowly elliptic-oblong to oblong-lanceolate, the larger ones 1–3 cm. broad and 2–6 cm. long; corolla 2–3.5 cm. long, its tube 0.7–2.3 cm. long; plant chiefly of Cumberland Plateau..... 10f. Var. *calvescens*.

10a. Var. ***typica***. *R. hirsuta* Ell. Sk. ii. 109 (1822), not Vell. (1790). *R. humilis* Nutt. in Trans. Am. Phil. Soc. v. 182 (1837). *Dipteracanthus noctiflorus*, ♂. *humilis* Nees in DC. Prodr. xi. 123 (1847), at least as to basonym. *R. ciliosa*, var. *longiflora* Gray, Syn. Fl. N. Am. ii¹, 326 (1878) in part only. *R. ciliosa*, var. *humilis* (Nutt.) Britton in Trans. N. Y. Acad. Sci. ix. 185 (1890), at least as to basonym.—Dry prairies, rocky slopes, open woods, etc., southern and eastern Iowa to Texas, east to the Mississippi and very locally to south-central Pennsylvania, western Maryland, western Virginia, Tennessee and northwestern Alabama. The following are characteristic (all, unless specified, called *R. ciliosa* Pursh). PENNSYLVANIA: FRANKLIN CO.: "abundant and common", Chambersburg, July 24, 1896, *Thos. C. Porter*

(NY, Phil), variously as *R. ciliosa*, *R. ciliosa*, var. *parviflora* and *R. strepens*, var.; dry ground, among grasses, near Baker Cavern, south of Williamson, *Hans Wilkens*, no. 5592 (Pa); Mercersberg, 1846, *Ruel* (Phil), as *R. strepens*. MARYLAND: WASHINGTON CO.: Potomac River, Williamsport, Aug. 1849, *Porter* (Phil), as *Dipteracanthus strepens*. WEST VIRGINIA: HARDY CO.: Lost River, Aug. 18, 1931, *Core* (NY). VIRGINIA: GILES CO.: Ripplemead, Aug. 29, 1933, *Alexander, Everett & Pearson* (NY), as *R. parviflora*; roadside near Stone Quarry, above Ripplemead, July 19, 1936, *M. L. Vardell* (Pa); limestone cliffs, Ripplemead, August 11, 1937, *Lena Artz* (MtL). OHIO: CUYAHOGA CO.: near Blue Rock Springs, Cleveland, *Greenman*, no. 1542. INDIANA: ST. JOSEPH CO.: South Bend, Aug. 3, 1909, *Mrs. Joseph Clemens* (NY). WARREN CO.: dry, sunny poor soil, northwest of Covington, *R. M. Tryon, Jr.*, no. 2698 (Duke), as *R. carolinensis*. FLOYD CO.: rocky woods between Duncan and New Albany, *Deam*, no. 13,995 (NY). CRAWFORD CO.: rocky, exposed wooded hillside southwest of Milltown, *Deam*, no. 16,422. KENTUCKY: LOGAN CO.: limestone ledges and barrens, near Russelville, *E. J. Palmer*, no. 17,758 (Mo), as *R. parviflora* (transition to var. *calvescens*). TENNESSEE: DAVIDSON CO.: copses, vicinity of Nashville, *Gattinger*; West Nashville, *Egleston*, no. 5160. FRANKLIN CO.: Cumberland Mts., Cowan, *Ruth*, no. 564 (US). ALABAMA: FRANKLIN CO.: small flat cedar glade just north of Isbell, *R. M. Harper*, no. 3887 (US, VPI), as *R. carolinensis* (transition to var. *calvescens*). MISSISSIPPI: LOWNDES CO.: sandy, open places, banks of Tombigbee River, Columbus, June 15, 1892, *C. Mohr* (US), as *R. ciliosa*, var. *hybrida*. WARREN CO.: near Vicksburg, *Paul J. Schallert, Jr.*, no. 13127 (*Schallert*). ILLINOIS: COOK CO.: limestone cliffs, Lemont, July 20, 1912, *E. L. Braun* (Braun). WILL CO.: near Romeo, Aug. 6, 1895, *Umbach* (US). KANKAKEE CO.: river-bank, vicinity of Kankakee, *C. C. Crampton*, no. 568 (US). RICHLAND CO.: southwest of Calhoun, *Robt. Ridgway*, no. 3183, in part (Phil). KENDALL CO.: Yorkville, September, 1884, *T. E. Boyce*. LEE CO.: Dixon, July, 1861, *Wm. Boott* (Phil), as *Dipteracanthus ciliosus*, correctly annotated as *R. humilis*. WASHINGTON CO.: Ashley, *F. Beckwith*, no. 47 (Mo). JACKSON CO.: gumbo soil, woods, Big Muddy River, *John McCree, Jr.*, no. 833 (Mo). UNION CO.: southwest of Lick Creek, Oct. 7, 1939, *E. Anderson & Wm. Bauer* (Mo). IOWA: CLINTON CO.: Lyons, *Pammel*, no. 77 (NY). HENRY CO.: Mt. Pleasant, *C. R. Ball*, no. 1564 (Mo), *J. H. Mills*, no. 1732 (Mo). DECATUR CO.: dry soil, Aug. 4, 1903, *J. P. Anderson* (Mo). MISSOURI: CLARK CO.: Aug. 27, 1892, with cleistogamous flowers (NY). MARION CO.: woods, Hannibal, *John Davis*, no. 978 (Mo). RALLS CO.: dry hillsides, west of Hannibal, *John Davis*, no. 4646 (Mo). PIKE CO.: Eolia, Aug. 26, 1916, *John Davis* (Mo). ST. LOUIS CO.: Meramec Highlands, July 29,

1905, A. G. Johnson (Mo); West Webster, *Uphof*, no. 3803 (Mo). JEFFERSON CO.: Cedar Hill, John H. Kellogg, no. 1185 (Mo). FRANKLIN CO.: Pacific, Sept. 18, 1910, Moses Craig (Mo). BUTLER CO.: woods, *Bush*, no. 3739 (Mo, NY, US), as *R. parviflora*. SHANNON CO.: *Bush*, no. 70, identification correctly altered to *R. humilis*. COOPER CO.: rocky woods, *Bush*, no. 15,137 (Mo). MORGAN CO.: rocky woods, *Bush*, no. 15,147 (Mo). WEBSTER CO.: upland limestone glade, north of Forkner's Hill, Steyermark, no. 23,854 (Mo), as *R. carolinensis*. OZARK CO.: rocky open ground (dolomite), slopes of "Bald Jesse", near Gainesville, E. J. Palmer, no. 33,073 (Mo). BENTON CO.: Cole Camp, *Trelease*, no. 439 (Mo). BARRY CO.: barrens, *Bush*, no. 15,007 (Mo), as *R. parviflora*. CLAY CO.: Chandler, June 29, 1893, A. C. Magruder (Mo), as *R. ciliosa*, var. *humilis*. JACKSON CO.: rocky barrens, Greenwood, *Bush*, no. 9745 (Mo, NY), as *R. parviflora*; Rocky Bluff, south of Independence, K. K. Mackenzie, no. 1065 (NY), as *R. ciliosa*, var. *humilis*. JASPER CO.: chert barrens, Joplin, E. J. Palmer, no. 1309 (Mo) and no. 18,451 (NY), the latter as *R. parviflora*. NEWTON CO.: chert barrens, Reding's Mill, E. J. Palmer, no. 1532 (Mo). McDONALD CO.: July 24, 1893, *Bush* (Mo). ARKANSAS: WITHOUT STATED LOCALITY: "on rocks in the upland forests and prairies", Nuttall, TYPE OR ISOTYPE (NY), the specimen marked by Britton *R. ciliosa* Pursh. CLAY CO.: woods, Moark, *Bush*, no. 3746 (Mo), as *R. parviflora*. LONOKE CO.: fallow fields, Carlisle, Demaree, no. 17,613 (Mo), as *R. carolinensis*. PULASKI CO.: rocky ridges, Fourche Mt., Demaree, no. 19,797 (Mo), as *R. carolinensis*. CARROLL CO.: rocky slopes, Eureka Springs, E. J. Palmer, no. 4426 (Mo). BENTON CO.: Decatur, 1899, E. N. Plank (NY). JOHNSON CO.: ridges, Knoxville, Demaree, no. 19,933 (Mo), as *R. carolinensis*. FRANKLIN CO.: low ridges, Branch, Demaree, no. 17,786 (NY), as *R. carolinensis*. YELL CO.: dry rocky ridges, Tones Mt., Dardanelle, Demaree, no. 20,006 (Mo, NY). SCOTT CO.: dry low hills, Mansfield, Demaree, no. 18,171 (NY). LOUISIANA: CALCASIEU PARISH: Lake Charles, S. M. Tracy, no. 3468 (NY). KANSAS: CRAWFORD CO.: 6 miles west of Pittsburg, Rydberg & Imler, no. 164 (NY). LABETTE CO.: bluffs north of Oswego, Rydberg & Imler, no. 359 (NY). MONTGOMERY CO.: northeast of Caney, Rydberg & Imler, no. 401 (NY). OKLAHOMA: OTTAWA CO.: woods, Miami, G. W. Stevens, no. 2304. MCCURTAIN CO.: woods, near Idabel, H. W. Houghton as G. W. Stevens, no. 3633. OSAGE CO.: dry knoll, near Pawhuska, G. W. Stevens, no. 1931. PAYNE CO.: Stillwater, Waugh, no. 144 (Mo); sandy clay soil, north of Stillwater, Robert Stratton, no. 141 (Mo). ELLIS CO.: sand, Arnett, L. F. Locke, no. 25 (US). TEXAS: WOOD CO.: sands, Mineola, Reverchon (Mo). JEFFERSON CO.: west of Beaumont, April 11, 1921, E. T. Wherry (US), correctly identified. HARRIS CO.: prairies, Laporte, Reverchon, no. 3938

(Mo), as *R. parviflora*. BRAZOS CO.: College Station, *R. G. Reeves*, nos. 167 and 168 (US). DALLAS CO.: dry places, Dallas, July, 1877, *Reverchon* (NY). BELL CO.: dry woods, near Temple, *S. E. Wolff*, no. 2288 (US). TARRANT CO.: sandy post-oak woods between Grapevine and Ft. Worth, *Lundell & Lundell*, no. 9516 (US). FAYETTE CO.: Crawford, 1892 (Mo). LAVACA CO.: Hallettsville, *G. L. Fisher*, no. 100 (US). BEXAR CO.: bank of Helotes Creek, northwest of San Antonio, *Sister Mary Clare Metz*, no. 59 (NY). KERR CO.: hillside woods, Lacey's Ranch, *E. J. Palmer*, no. 9994 (Mo). PLATES 854 and 855; MAP 9.

The minor form with white corollas is

Forma **alba** (Steyermark), comb. nov. *R. carolinensis*, forma *alba* Steyermark in RHODORA, xli. 585 (1939).—TYPE from MISSOURI: prairie-slopes above limestone bluffs along Long Creek, 1½ miles south of Kingston, Caldwell County, Steyermark, no. 3058 (ISOTYPE Mo).

Although the description of forma *alba*, as a form of *Ruellia carolinensis* (a strikingly different species not found in Missouri), gave no indication that it is an albino of the sessile-leaved species of the prairie-region and not at all of *R. carolinensis*, the isotype is quite like typical *R. humilis* except for its white corolla.

Forma **grisea**, f. nov. (TAB. 856) caulis internodiis griseo-puberulis vel cinereo-pilosus, vix hirsutis.—Scattered through the range of var. *typica*. OHIO: PICKAWAY CO.: Aug. 9, 1912, *R. R. Dreisbach* (Phil). ILLINOIS: JACKSON CO.: gravelly hillside, Grand Tower, Aug. 28, 1900, *Gleason*, no. 1803. MISSOURI: PHELPS CO.: Jerome, Oct. 5, 1913, *John H. Kellogg*, no. 157 (Mo). JACKSON CO.: dry open bank, Kansas City, Sept. 15, 1916, *Ralph Hoffmann* (Mo). MCDONALD CO.: dry ground, uncommon, July 24, 1893, *Bush*, no. 281 (TYPE in Herb. Gray.; ISOTYPE in Herb. Britt.). LOUISIANA: JEFFERSON DAVIS PARISH: knolls in low prairie, May 17, 1915, *E. J. Palmer*, no. 7649 (Mo). CALCASIEU PARISH: Lake Charles, Aug. 7, 1897, *S. M. Tracy*, no. 3469 (US). OKLAHOMA: OTTAWA CO.: pasture near Narcissa, Aug. 31, 1937, *F. R. Fosberg*, no. 14,289 (Penn). TEXAS: VAN ZANDT CO.: Grand Saline, Oct. 18, —, *Reverchon* (Mo).

Var. **frondosa**, var. nov. (TAB. 857), internodiis valde villosohirsutis; axis primarii foliis majoribus ovatis vel ovali-oblongis vel late ellipticis, 3.5–8 cm. longis 2–4 cm. latis, plerumque obtusis; corollis 3–4.5 (–5) cm. longis tubo 1.2–3 cm. longo.—Southeastern Nebraska to eastern Texas and Louisiana, eastward to south-central Pennsylvania and western Virginia; specimens, unless otherwise noted, originally called *R. ciliosa*, in a few cases corrected to *R. humilis*. PENNSYLVANIA: FRANKLIN CO.: Chambersburg, Aug. 27, 1897, *Thos. C. Porter*. VIRGINIA:



Photo. B. G. Schubert.

RUELLIA HUMILIS, var. TYPICA: FIG. 1, median nodes of primary axis, $\times 1$; FIG. 2, summit of internode and bases of leaves, $\times 4$; FIG. 3, portion of fruiting branch, showing diffuse habit, $\times 1$



Photo, B. G. Schubert.

RIVELIA HYALINA, forma *GRISEA*; FIG. 1, portion of type; $\times 4$; FIG. 2, internode and bases of leaves, $\times 4$

SHENANDOAH CO.: rocky (limey) woods, near Strasburg, Hunnewell, no. 12,037 (FWH), as *R. carolinensis*; limestone barrens near Strasburg, June 6, 1936, Hunnewell (VPI), as *R. carolinensis*; damp thicket near Meadow Mills, Hunnewell, no. 17,837 (FWH). WYTHE CO.: banks, Reed Creek, June 28, 1910, F. S. H. (VPI). OHIO: CUYAHOGA CO.: Euclid Heights, Cleveland, Greenman, no. 353; near Blue Rock Springs, Cleveland, Greenman, nos. 1541 and 1542 (US). GREEN CO.: Xenia, July 10, 1883, H. A. Young; open bottoms, Yellow Springs, July 10, 1935, Demaree, no. 11,436 (Mo, Phil); Cedarville, July, 1906, J. F. Clevenger (US). MONTGOMERY CO.: Dayton, John W. VanCleve (Phil), as *R. oblongifolia*. CLERMONT CO.: sandy soil, gravel terrace, Mulford, June 17, 1916, E. L. Braun (Braun). HAMILTON CO.: gravel banks, near Fernald, July 19, 1914, E. L. Braun (Braun). INDIANA: WARREN CO.: prairie north of Tab, August 31, 1916, Deam, no. 21,613 (NY); high bank of Pine Creek, west of Kramer, July 8, 1918, Deam, no. 25,843. MARION CO.: abundant among tall weeds between Indianapolis and Carmel, Aug. 8, 1942, R. C. Friesner, no. 17,202 (TYPE in Herb. Gray.; ISOTYPE in Herb. Butler Univ.), distrib. as *R. carolinensis*; same station, August 5, 1944, Friesner, no. 18,579 (topotypes). HARRISON CO.: bluff, south side of Buck Creek, southeast of Corydon, June 15, 1940, Friesner, no. 14,369 (Duke, NY), as *R. carolinensis*. KENTUCKY: PENDLETON CO.: dry grassy bank, south of Peach Grove, July 8, 1941, E. L. Braun, no. 4037. TENNESSEE: DAVIDSON CO.: West Nashville, May 26–27, 1909, Eggleston, no. 4436 (Phil). ILLINOIS: COOK CO.: Chicago, H. H. Babcock (US); Flossmoor, Aug. 1, 1909, Greenman, no. 2816. DUPAGE CO.: introduced along roadside, Naperville, Aug. 1, 1897, L. M. Umbach (US). WILL CO.: roadside, Romeo, June 25, 1896 (Phil), July 26, 1897 (US), Umbach. WINNEBAGO CO.: Rockford, July 11, 1926, Pammel & Fisk, no. 293 (Mo). RICHLAND CO.: Larchmount, Aug. 1, 1914, Robt. Ridgway. CHAMPAIGN CO.: vicinity of Urbana, Aug. 10, 1910, Steele (US). STARK CO.: gravel slope, near Wady Petra, July 9, 1900, V. H. Chase, no. 673 (Phil). HANCOCK CO.: Augusta, 1845, S. B. Mead, as *R. strepens*. ST. CLAIR CO.: dry ground, June 28, 1875, Henry Eggert (Mo). IOWA: CLINTON CO.: Clinton (Lyons), Sept. 4, 1896, Pammel, no. 77. WARREN CO.: Indianola, July 6, 1918, Pammel, Welbus & Jacques. MISSOURI: CLARK CO.: Dumas, Aug. 27, 1892, Bush (Mo). ST. LOUIS CO.: collines arides, St. Louis, Juillet 1838, Riehl (Mo), as *R. strepens*; O'Fallon Park, St. Louis, June 28, 1892, N. M. Glatfelter (Mo). JEFFERSON CO.: Bushberg, July 4, 1883, F. C. Prince. ST. FRANCOIS CO.: dry ground, Bismark, Aug. 1897, Colton Russell (Mo). CARTER CO.: dry open ground, Van Buren, July 6, 1913, E. J. Palmer, no. 6205 (Mo). NODAWAY CO.: dry grassy openings, northwest of Parnell, June 20, 1938, Steyermark, no. 5936 (Mo). JACKSON CO.:

dry grounds, Waldo Park, June 10, 1896, *K. K. Mackenzie* (US). JOHNSON CO.: sandstone hillside, Warrenburg, Aug. 27, 1916, *G. W. Stevens*, no. 4106 (NY). GREENE CO.: northeast of Springfield, Aug. 29, 1911, *P. C. Standley*, no. 8390 (US). JASPER CO.: chert barrens, northwest of Joplin, Aug. 16, 1908, *E. J. Palmer*, no. 1309 (Mo). MCDONALD CO.: dry open ground, Noel, Sept. 7, 1913, *E. J. Palmer*, no. 4164 (Mo); chert slopes west of Noel, May 31, 1938, Steyermark, no. 562 (Mo), as *R. carolinensis*. ARKANSAS: FAULKNER CO.: rocky glade, Guy, Sept. 4, 1934, Demaree, no. 10,963 (US). PULASKI CO.: Little Rock, July, 1886, *H. E. Hasse* (NY). CARROLL CO.: Eureka Springs, July 17, 1898, *N. M. Glatfelter* (Mo). LOUISIANA: RAPIDES PARISH: pine woods, vicinity of Alexandria, June 6, 1899, *C. R. Ball*, no. 655, in part (Mo, US). NEBRASKA: LANCASTER CO.: roadsides, Lincoln, Aug. 1889, *H. J. Webber* (US). KANSAS: DOUGLAS CO.: Lawrence, *W. C. Stevens* (US). RILEY CO.: prairie, June 15, 1895, *J. B. Morton*, no. 386 (Mo). GEARY CO.: Republican Fork of Kansas River, June 25, 1856, *H. Engelmann* (Mo). CHEROKEE CO.: road through wooded area, southeast corner of county, July 23, 1937, *N. B. Jacobs*, no. 134 (NY). COWLEY CO.: 1895, *C. M. Gould* (NY). OKLAHOMA: ELLIS CO.: east of Harmon, June 17, 1932, *H. Wilkens* (Phil). TEXAS: VAN ZANDT CO.: sandy pasture 1 mile east of Martin's Mill, May 7, 1939, *Durward Timmons*, no. 522 (NY). TRAVIS CO.: Austin, *C. Wright*. MAP 10.

Var. **longiflora** (Gray), comb. nov. Stems villous-hirsute; leaves copiously villous-hirsute on veins and margins; the larger ones of the main axis elliptic-oblong to oblong-lanceolate, 1-2.5 cm. broad and 3-6 cm. long, obtuse to subacute: corolla 5-8 cm. long, its tube 3-5 cm. long.—*R. ciliosa*, var. *longiflora* Gray, Syn. Fl. N. Am. ii¹, 326 (1878) as to descr., largely excl. synonyms. *Dipteracanthus Drummondii* Torr. & Gray ex Engelm. & Gray in Bost. Journ. Nat. Hist. v. 258 (1845), not *D. Drummondianus* Nees.—Southern Illinois, Missouri and eastern Kansas to Louisiana and Texas; specimens, unless noted, distributed as *R. ciliosa*, more rarely as *R. humilis*. ILLINOIS: RICHLAND CO.: Parkersburg, June 14, 1902, Robt. Ridgway (US). MACOUPIN CO.: Piasa, Aug. 5, 1905, *G. E. McClure* (Mo). WILLIAMSON CO.: dry soil, Bush, *John McCree, Jr.* no. 881 (Mo). MISSOURI: MARION CO.: dry soil, near Mark Twain Cave, *John Davis*, no. 4101 (Mo). LINCOLN CO.: Silex, *John Davis*, no. 3887 (Mo). ST. LOUIS CO.: Windsor Springs, July 1, 1890, *A. S. Hitchcock* (Mo). JEFFERSON CO.: stony hills north of Hematite, July 7, 1891, *Henry Eggert*, (Mo); dry limestone glade southwest of Crystal City, Steyermark, no. 1114 (Mo), as *R. carolinensis*; Festus, July 11, 1925, *Woodson* (Mo); south of Festus, *Mildred Mathias*, no. 700 (Mo). WASHINGTON CO.: Potosi, July 24, 1885, *Frederick Wislizenus* (Mo). COOPER CO.: rocky barrens, *Bush*, no. 13,673 (Mo).

GREENE CO.: dry hills near Fulbright Spring, *P. C. Standley*, no. 9567 (US). TANEY CO.: Forsythe, *Trelease*, no. 440 (Mo), as *R. ciliosa*, var. *longiflora*. JACKSON CO.: rocky hillside, June 15, 1864, *G. C. Broadhead* (Mo). BENTON CO.: Mora, *Trelease*, no. 438 (Mo). ST. CLAIR CO.: rocky woods, Osceola, *Bush*, no. 12,819 (Mo). JASPER CO.: Aug. 16, 1893, *Bush* (Mo), as *R. ciliosa*, var. *longiflora*. ARKANSAS: CRAIGHEAD CO.: open woods, Lake City, *Demaree*, no. 3391 (Mo). SHARP CO.: Hardy, *Greenman*, no. 152^a (Mo). ASHLEY CO.: prairie-thickets, Mist, *Demaree*, no. 15,096 (Mo). FAULKNER CO.: rocky hillsides, Guy, *Demaree*, no. 10,963 (NY). CONWAY CO.: Petit Jean Mt., Morrilton, June 25, 1937, *John K. Edwards* (Pa). LOGAN CO.: rocky, dry situations at 2800 ft., Magazine Mt., *Demaree*, no. 17,720 (Mo, NY), as *R. carolinensis*. SEBASTIAN CO.: Fort Smith, 1853-4, *J. M. Bigelow* (US). LOUISIANA: WITHOUT CITED STATION: western Louisiana, Hale, TYPE of *R. ciliosa*, var. *longiflora* Gray, in Torrey Herb. (NY). NATCHITOCHES PARISH: dry open ground, Natchitoches, *E. J. Palmer*, no. 7940 (NY); dry sandy ground, Chopin, *E. J. Palmer*, no. 7565 (Mo); long-leaf pine sandhills, June 20, 1930, *Caroline Dorman* (NY). RAPIDES PARISH: Alexandria, *Josiah Hale* (NY). JEFFERSON DAVIS PARISH: knolls on low prairies, Welsh, *E. J. Palmer*, no. 7649 (NY). CALCASIEU PARISH: low grassy soil, 1 mile east of Lake Charles, *D. S. & H. B. Correll*, no. 9652. KANSAS: WITHOUT DEFINITE LOCALITY: between Neusha and Red Fork, Sept., 1849, *Marcy Exped.* RILEY CO: Manhattan, Sept. 29, 1884, *M. A. Carleton* (Mo). LYON CO.: Emporia, July 13, 1891, *E. C. Smith* (Mo). MONTGOMERY CO.: dry prairie, Cherryvale, September 16, 1900, *Frank W. Johnson* (NY). SEDGWICK CO.: Wichita, 1892, *H. R. Rose*. OKLAHOMA: CRAIG CO.: north of Vinita, *G. J. Goodman*, no. 3047. OSAGE CO.: dry knoll, Pawhuska, *G. W. Stevens*, no. 1931. CREEK CO.: Sapulpa, *Bush*, no. 428 (Mo). TEXAS: WITHOUT STATED LOCALITY: *Drummond*, nos. 219 and 220 (PARATYPES) and 258 (nos. 220 and 258 the types of *Dipteracanthus Drummondii* Torr. & Gray); *Lindheimer*, no. 158; *Reverchon*, no. 725 (Mo). TYLER CO.: pineland south of Woodville, *Lundell & Lundell*, no. 11,544 (US). HARDIN CO.: east of Camp Jackson, *Cory*, no. 19,793. HOUSTON CO.: sandy open ground, Latexo, *E. J. Palmer*, no. 12,820 (Mo, NY). WALKER CO.: vicinity of Huntsville, *R. A. Dixon*, no. 377. MONTGOMERY CO.: Willis, *L. R. Warner* (Mo). HARRIS CO.: open woods, June, 1842, *Lindheimer* (Mo); prairies, Houston, *Elihu Hall*, no. 425 (Mo, NY, US); low ground, Houston, *Biltmore Herb.*, no 4501^b (US), as *R. noctiflora*; Laporte, *Reverchon*, no. 3938 (Mo, NY). FORT BEND CO.: Richmond, *W. L. Bray*, no. 96 (US). AUSTIN CO.: sandy loam of prairie, San Felipe, *F. W. Pennell*, no. 10,292 (NY). COLORADO CO.: dry sandy oak-land, Sheridan, *F. W. Pennell*, no. 5520 (Pa). DALLAS CO.: Dallas, June, 1874, *Reverchon*, no. 410, PARATYPE; vicinity

of Dallas, *Mary R. Stephenson*, no. 92 (US); creek-bottoms, north of White Rock Lake, *Lundell*, no. 11,676 (US); post-oak woodland, north of Seagoville, *Lundell*, no. 11,679 (US). TARRANT CO.: Fort Worth, *Ruth*, no. 103 (different sheets as no. 103, distributed as from dry woods, June 27, 1911 (NY), dry woods, August 10, 1912 (Mo), open woods, Oct. 2, 1912 (G) and from rocky ground, Aug. 10, 1924 (NY)). TRAVIS CO.: Austin, *Tharp*, no. 1384 (US). BASTROP CO.: McDade, Va. *Collins*, no. 266. DE WITT CO.: hillside, July 30, 1941, *Marguerite Riedel*. BEXAR CO.: hills north of San Antonio, Sept. 1, 1900, *Henry Eggert* (Mo). TOM GREEN CO.: Knickerbocker Ranch, Dove Creek, May, 1880, *Frank Tweedy* (US), as *R. ciliosa*, var. *longiflora*. PLATE 858; MAP 11.

Var. **expansa**, var. nov. (TAB. 859), caulinibus ad 8.5 dm. altis, internodiis valde villoso-hirsutis; axis primarii foliis majoribus ovatis vel ovali-oblongis vel late ellipticis apice obtusis, 2.5–4 cm. latis 3–7.5 cm. longis, ciliato-hirsutis; corollis 5–8 cm. longis, tubo 3–5 cm. longo.—Iowa and Nebraska to Texas, eastward to southern Michigan, western Indiana, Illinois, Missouri, and very locally to northeastern Mississippi and northwestern Florida; specimens, unless specially noted, originally distributed as *R. ciliosa*, more rarely as *R. humilis*. FLORIDA: CALHOUN CO.: Dead Lakes, *Chapman* (Mo). MICHIGAN: old specimen marked by Asa Gray "Michigan coll.". WISCONSIN: ROCK CO.: Beloit, 1860, *T. J. Hale* (Phil). INDIANA: TIPPECANOE CO.: dry sandy soil, Lafayette, July 4, 1898 (USNA), as *R. ciliosa*. MONTGOMERY CO.: roadside near Clarksville, Aug. 12, 1934, *Scott McCoy*, no. 2010 (US). ILLINOIS: COOK CO.: Chicago, July 7, 1873, *H. H. Babcock* (US); prairie, Streator, Aug. 11, 1929, *Howard K. Henry*, no. 130 (Pa); between the Sag and Palos Park, Sept. 1, 1908, *Caldwell & Greenman*, no. 3584 (Mo); Riverside, June 29, 1871, *H. H. Babcock* (NY), July, 1888, *E. L. Sturtevant* (Mo). WILL CO.: Joliet, July 4, 1900, *H. P. Skeels* (USNA). WINNEBAGO CO.: Fountaindale, *M. S. Bebb*, as *Dipteracanthus strepens*. WOODFORD CO.: Minonk, Aug. 13, 1895, *Chas. Thom* (USNA). PEORIA CO.: Peoria, 1868, *J. T. Stewart* (Phil); dry barrens, Peoria, June, 1887, *F. E. McDonald*; dry prairies, Peoria, July, 1903, and July, 1904, *F. E. McDonald*. MASON CO.: Havana, Aug. 17, 1904, *Gleason*. HENDERSON CO.: oak barrens, near Oquawka, July 6 and August 20, 1872, *H. N. Patterson*. MCLEAN CO.: Bloomington, Aug. 1886, *E. C. Smith* (Mo). CHAMPAIGN CO.: Champaign, June 15, 1899, *Gleason*, no. 590; prairie, Urbana, July 15, 1878, *A. B. Seymour* (Duke). MACON CO.: openings in timber, Stevens Creek at Wabash, July 1, 1915, *I. W. Clokey*, no. 2429 (TYPE in Herb. Gray; ISOTYPES in Herb. Mo. Bot. Gard., N. Y. Bot. Gard. and U. S. Nat. Herb.); Decatur, July 14, 1940, *R. G. Mills* (NY). HANCOCK CO.: Augusta, 1843, *S. B. Mead* as *R. strepens*? ADAMS CO.: Camp Point, Aug. 6,



Photo. B. G. Schubert.

RUELLIA HUMILIS, var. FRONDOSA: FIG. 1, portion of TYPE, $\times \frac{1}{2}$; FIG. 2, summit of internode and bases of leaves, $\times 4$; FIGS. 3-5, flowering nodes, $\times 1$; FIG. 6, fruiting node, $\times 1$; FIG. 7, calyx and capsule, $\times 2$



Photo, B. G. Schubert.

RUELLIA HUMILIS, var. LONGIFLORA: FIGS. 1-3, summits of flowering branches, $\times 1$; FIG. 4, summit of internode and bases of leaves, $\times 4$; FIG. 5, bracts, calyces and fruits, $\times 2$

1877, *A. B. Seymour* (Duke). ST. CLAIR CO.: woods, Belleville, July, 1846, *Th. Hilgard, Jr.* (Mo)—plant 8.25 m. high. RANDOLPH CO.: Red Bud, June 30, 1888, *L. H. Pammel* (Mo). MISSISSIPPI: OKTIBBEHA CO.: Ageney, May 31, 1897, *S. M. Tracy*, no. 3203 (NY). IOWA: JOHNSON CO.: Aug. 13, 1909, *M. P. Somes*, no. 3617 (US). VAN BUREN CO.: open woods, Bentonport, July, 1920, *E. W. Graves*, nos. 1687 and 1957 (Mo). WAYNE CO.: July, 1885, *R. R. B.* (Phil). GREENE CO.: Jefferson, July 24, 1867, *J. A. Allen*. MADISON CO.: Peru, June 20, 1897, *D. E. Hollingsworth*, no. 577. RINGGOLD CO: Mount Ayr, July 24, 1926, *Ada Hayden* (Phil). FREMONT CO.: rich soil, border of woods, Manti, July 12, 1925, *L. H. Pammel*, no. 733. MISSOURI: MARION CO.: dry woods, Hannibal, Aug. 7, 1912, *John Davis* (Mo). PIKE CO.: dry meadow, near Clarkesville, June 15, 1914, *John Davis*, no. 2677 (Mo). ST. LOUIS CO.: limestone hill, Pacific, June 3, 1918, *J. R. Churchill* (Mo). WASHINGTON CO.: Irondale, June 30, 1893, *Henry Eggert*. CARTER CO.: rocky open ground, Van Buren, July 6, 1914, *E. J. Palmer*, no. 6205. PHELPS CO.: Jerome, June 16, 1914, *John H. Kellogg* (Mo). BOONE CO.: banks of Missouri River, Rocheport, July 4, 1927, *H. W. Rickett* (Duke). WRIGTH CO.: open woods, east of Mansfield, June, 1911, *O. E. Lansing*, no. 3180. MORGAN CO.: rocky woods, June 11, 1934, *Bush*, no. 13,708 (Mo, Pa). HICKORY CO.: cherty limestone slopes, east of Jordan, July 10, 1934, *Steyermark*, no. 13,216 (Mo). GREENE CO.: Springfield, July, 1904, *P. C. Standley* (US). JACKSON CO.: Independence, June 10, 1894, *Bush*, no. 349; barrens, Independence, July 6, 1900, *Bush*, no. 775 (Mo, US) and several other nos. (one of them with the penciled memorandum, "type of *R. ciliosa*", a difficult proposition to defend since Pursh's species was from Savannah, Georgia!). BARRY CO.: fields, Eagle Rock, June 29, 1897, *Bush*, no. 506 (Mo). JASPER CO.: dry prairies, Carthage, July 13, 1902, *Bush*, no. 356 (Mo). McDONALD CO.: dry ground, *Bush*, no. 282 (NY), as *R. ciliosa*, var. *longiflora*. ARKANSAS: WITHOUT STATED LOCALITY: *Krugholdt*, no. 24. PRAIRIE CO.: Hazen, Grand Prairie, June 29, 1941, *Demaree*, no. 23,304 (Mo), as *R. caroliniensis*. CARROLL CO.: Eureka Springs, July 7, 1898, *N. M. Glatfelter* (Mo). BENTON CO.: prairie-like thickets, Willow Springs, Aug. 9, 1941, *Demaree*, no. 22,380 (Mo), as *R. caroliniensis*. LOUISIANA: RED RIVER PARISH: *J. Hale* as *R. hirsuta* Ell. NATCHITOCHES PARISH: dry open ground, Natchitoches, June 10, 1913, *E. J. Palmer*, no. 7946, in part (Mo). RAPIDES PARISH: Alexandria, 1844, *Josiah Hale* (NY, Phil, US). NEBRASKA: LANCASTER CO.: Lincoln, *H. J. Webber* (Mo). KANSAS: RILEY CO.: prairie, June 15, 1895, *J. B. Norton*, no. 386; Manhattan, 1883, *T. Bassler* (NY), June 5, 1887, *W. A. Kellerman* (Mo). BUTLER CO.: July, 1904, *S. C. Jones* (Mo). ROOKS CO.: Rockport, July 5, 1892 (US).

ELLIS CO.: Cyril Zeller (Mo). OKLAHOMA: OTTAWA CO.: pasture near Narcissa, Aug. 31, 1937, F. R. Fosberg, no. 14,289 (Pa). PITTSBURG CO.: rocky woods west of McAlester, May 27, 1920, F. W. Pennell, no. 10,600 (Phil). PAYNE CO.: Stillwater, June 22, 1926, Robt. Stratton, no. 622 (Mo); clay soil north of Stillwater, June 6, 1937, Darrell McLean, no. 3 (Phil). BRYAN CO.: Colbert, June 15, 1891, C. S. Sheldon, no. 14 (US), as *R. ciliosa*, var. *longiflora*. CLEVELAND CO.: Norman, Sept. 25, 1914, W. H. Emig, no. 522 (Mo), as *R. parviflora*. CADDO CO.: between Fort Cobb and Fort Arbuckle, 1868, Edw. Palmer (US), as *Dipteracanthus strepens*. COMANCHE CO.: Fort Sill, May 29, 1916, Mrs. Joseph Clemens. TEXAS: NEWTON CO.: Autreville, 1857, C. G. Fosberg (Phil). CAMP CO.: Pittsburg, Sept. 13, 1923, Tharp (Phil). GREGG CO.: July, 1939, C. L. York. WOOD CO.: post-oak woods, July 6, 1924, Tharp (US). HARRIS CO.: barren bluffs, Houston, Sept., 1843, Engelmann (Mo). DALLAS CO.: vicinity of Dallas, July 3, 1929, Mary R. Stephenson, no. 96 (US). PARKER CO.: Weatherford, July 4, 1902, S. M. Tracy, no. 8078. TRAVIS CO.: Austin, July 20, 1940, Tharp (transition to var. *longiflora*). NUECES CO.: near Corpus Christi, March, 1894, A. A. Heller (NY). COMANCHE CO.: DeLeon, June 16, 1941, Tharp. MAP 12.

Var. **calvescens**, var. nov. (TAB. 860), caulinis 1-4 dm. altis, ramosis, ramis plerumque divergentibus, internodiis glabris vel glabrescentibus vel sparse breviterque hispidis; foliis glabris vel glabrescentibus vel ad venas remote hirtellis, anguste elliptico-oblongis vel oblongo-lanceolatis, majoribus 2-6 cm. longis 0.7-2.3 cm. latis; corollis 2-3.5 cm. longis, tubo 0.7-2.3 cm. longo.—Cumberland Plateau of Kentucky and Tennessee, overlapping slightly into southern Indiana and southern Ohio, locally in Alleghenies of northwestern Virginia, Great Smoky Mountains of eastern Tennessee and mountains of northern Georgia and Alabama; specimens, unless otherwise noted, distributed as *R. ciliosa* or *R. humilis*. VIRGINIA: FREDERICK CO.: lime barrens, Middletown, Sept. 14, 1941, Hunnewell, no. 17,361, as *Dyschoriste oblongifolia* (misidentification mine). SHENANDOAH CO.: dry limrock barrens, 1 mile northeast of Strasburg, Aug. 30, 1927, Wiegand & Manning, no. 2934; rocky field near Ormandia, July 27, 1942, Hunnewell, no. 17,721 (FWH), as *Dyschoriste oblongifolia*. GEORGIA: WALKER CO.: Chickamauga Park, Biltmore Herb., no. 849^b (US). OHIO: HIGHLAND CO.: Sept., 1928, Katie M. Roads, September, 1928 (US). INDIANA: CRAWFORD CO.: in shallow soil on washed limestone slope, just north of Leavenworth, Oct. 5, 1920, Deam, no. 33,429 (Pa). KENTUCKY: WITHOUT STATED LOCALITY: 1916, Anna King, no. 310 (Duke and, in part, US); hills of Kentucky River, Aug. 15, 1895, H. Garman & J. N. Rose (TYPE in Herb. Gray; ISOTYPE in U. S. Nat. Herb.), distrib. as *R. strepens*. FLEMING CO.: dry soil

east of Hillsboro, Aug. 21, 1940, *E. L. Braun*, no. 3364 (Braun). ROBERTSON CO.: dry slopes, limestone soil, west of Blue Licks, July 8, 1941, *E. L. Braun*, no. 4044. NICHOLAS CO.: open woods, Blue Lick Springs, Sept. 17, 1936, *F. J. Scully*, no. 814 (US), as *R. parviflora*; dry soil, open red cedar, south of Fairview, Sept. 22, 1939, *E. L. Braun*, no. 2684 (Braun). SCOTT CO.: dry woods, Stamping Ground, July 27, 1931, *J. W. Singer*, no. 145 (US), as *R. parviflora*. PULASKI CO.: bluffs near Burnside, Aug. 22, 1903, *Biltmore Herb.* no. 849^k (US). NELSON CO.: prairie patches, Balltown, July 22, 1940, *E. L. Braun*, no. 3248 (Braun); dry limestone slope, prairie patches, west of Bardstown, Aug. 18, 1941, *E. L. Braun*, no. 4085. HARDIN CO.: thin soil over limestone, Howe Valley, Sept. 6, 1927, *Wherry & Pennell*, no. 73,642 (Phil). HART CO.: sandy roadside, 2 miles southeast of Horse Cave, Sept. 4, 1930, *Svenson*, no. 4418. GRAYSON CO.: Leitchfield, Aug. 22, 1895, *J. N. Rose* (US), as *R. strepens*; Leitchfield, Oct. 11 and 12, 1903, *W. W. Eggleston*, no. 5442 (NY). EDMONSON CO.: prairie patches, dry limestone slopes, Mammoth Cave, Aug. 19, 1941, *E. L. Braun*, no. 4095 (branching unusually strict). WARREN CO.: near Bowling Green, Aug. 17, 1897, *Henry Eggert* (Mo); field, Bowling Green, Aug. 20, 1899, *Sadie F. Price* (Mo). TENNESSEE: SEVIER CO.: between Gatlinburg and Maryville, July 27, 1936, *W. C. Coker* (NC). WILSON CO.: dry cedar glades, Lebanon, Aug. 11, 1900, *Biltmore Herb.* no. 849^g (US). DAVIDSON CO.: cedar barrens, common, *Gattinger* (Mo); Nashville, Aug., 1879, *Gattinger* (Mo); West Nashville, May 26–27, 1909, *Eggleston*, no. 4436 (US), Sept. 24–25, 1909, *Eggleston*, no. 5160 (NY, Phil). COFFEE CO.: near Manchester, Aug. 14, 1899, *Biltmore Herb.*, no. 849^b (US). RUTHERFORD CO.: near Lavergne, Aug., 1897, *Henry Eggert* (Mo). FRANKLIN CO.: Cumberland Mts., Cowan, July, 1898, *Ruth*, no. 556 (NY), no. 590 (Mo). ALABAMA: MADISON CO.: ad montes, prope Huntsville, Oct., 1843, *Rugel* (NY), with unpublished but quite appropriate varietal name. MAP 13.

When sorted out from the very diverse species with which it has been confused, *Ruellia ciliosa*, *R. carolinensis*, and even the wholly different *R. strepens* and the apocryphal *R. parviflora*, *Ruellia humilis* becomes a very consistent species of wide inland range. By the singular and not very edifying fatality which has obscured the clarification of even the simpler of our species of *Ruellia* the great bulk of material of the continental *R. humilis* (including its varieties) has very generally passed as *R. ciliosa* Pursh, its type from Savannah, Georgia, although there is no evidence in any of the larger American herbaria that the present species approaches Savannah nearer than the Shenandoah Valley

of Virginia, the Great Smoky Mountains of Tennessee, the mountains of northwestern Georgia, and the northwestern corner of Florida. Conversely, although *R. humiliis* was described from "rocks in the upland forests and prairies" of Arkansas, the name *R. humiliis* has been consistently used by Small and his followers for true and strikingly different *R. ciliosa* Pursh and given a range, "Sandy soil, Coastal Plain, Fla. to Miss. and Ga.", through a country without the dry limestone rocks where true *R. humiliis* prevails, and entirely excluding the type-region of the latter!

There is great probability that *Ruellia hirsuta* Ell. Sk. ii. 109 (1822) was typical *R. humiliis* Nutt. Elliott, familiar with the more eastern plants, went beyond the stated limits of his Sketch to describe a remarkable new species from "near the Alabama River in dry soils": "Hirsute, branching, leaves oval-lanceolate, nearly acute, sessile, segments of the calyx subulate, hispid, a little longer than the tube of the corolla . . . Stem . . . very hirsute. Leaves . . . almost hispid". Elliott's type is lost; furthermore his name was antedated by *R. hirsuta* Velloso (1790).

As the TYPE or ISOTYPE of *Ruellia humiliis* (until a possibly more authentic type is found) I have taken an Arkansas specimen from Nuttall, in the Torrey Herbarium. This (PLATE 854, FIG. 1) is of the relatively short-flowered series with narrow leaves, a plant (MAP 9) prevailing west of the Mississippi, southward into Texas, but scattered eastward even to the mountains of south-central Pennsylvania, western Maryland and western Virginia. This plant passes through obvious transitions into a coarser and broader-leaved extreme of similar range (MAP 10), which might perhaps be considered an ecological variety were it not that in their morphological characters they exactly parallel the two plants with greatly prolonged corolla-tube (the longest corolla of any of our species except the southeastern Coastal Plain *R. noctiflora*). Although the very long-flowered plants have similar areas of development, the narrow-leaved var. *longiflora* (MAP 11) is more restricted, its eastern range stopping essentially at the Mississippi, with northern limits in southern Illinois and Missouri; the broader-leaved var. *expansa* (MAP 12) with outposts eastward to northwestern Florida, northeastern Alabama and in Indiana and Wisconsin and, farther west,



Photo, B. G. Schubert.

RUELLIA HUMILIS, var. *EXPANSA*; FIG. 1, flowering node, $\times 1$, from TYPE; FIG. 2, median fruiting node, $\times 1$; FIG. 3, internode and leaf-base, $\times 4$; FIG. 4, calyx and capsule, $\times 2$



Photo, B. G. Schubert.

RUELLIA HUMILIS, VAR. *CALVESCENS*: FIG. 1, portion of ISOTYPE, $\times 1$; FIG. 2, flowering tip, $\times 1$; FIG. 3, internode and leaf-bases, $\times 4$; FIG. 4, lower surface of leaf, $\times 10$; FIG. 5, fruiting nodes, $\times 1$; FIG. 6, calyx and capsule, $\times 2$

extending well into Iowa. These two plants, although merging, seem fairly well defined. In Texas and Louisiana var. *longiflora* has often been mistaken for the more eastern Coastal Plain *R. noctiflora*. It is promptly distinguished, however, by its greatly developed villous-hirsute pubescence, *R. noctiflora* being puberulent; by its short and strongly hirsute-ciliate calyx-segments, those of *R. noctiflora* prolonged (2.5–4.5 cm. long) and puberulent; and by its short and glabrous capsule, the very long (2.25–3.5 cm. long) capsule of *R. noctiflora* pubescent.

As extreme as any variation of *Ruellia humilis* is var. *calvescens* (MAP 13), concentrated on the Cumberland Plateau, with colonies along the Alleghenies and the Great Smokies. Smaller in all parts than most members of the species and nearly glabrous, it has been mistaken (by the writer among others) for *Dyschoriste oblongifolia* (Michx.) Ktze. In their more upright extremes the two plants are often superficially similar, but the technical differences of calyx-segments and anthers hold. Furthermore, when the ripe seeds of *R. humilis*, var. *calvescens*, like those of all our species of *Ruellia*, are moistened they promptly exude mucilage which soon takes the form of prolonging and streaming spiracles which finally give the seed a more or less plush-like surface. Many tests of seeds of *Dyschoriste oblongifolia* have shown no such mucilage-spiracles there. The latter species, furthermore, is a plant of southern Coastal-Plain pine barrens and fall-line sands, northward to South Carolina (the old and doubted basis for it as Virginian, in the Gray Herbarium, being a specimen with copied—not original—label, reading “Southern States. Virginia”), not of calcareous upland.

(*To be continued*)

MARINE ALGAE OF THE MONTEREY PENINSULA¹.—Those who are interested in the seaweeds of the Pacific coast of the United States will receive with approval this book which, while dealing only with the marine algae of the Monterey region, is, nevertheless, usable for nearly all parts of that coast. The book should appeal especially to three groups of individuals, to all biologists, but particularly algologists, who will receive it with delight, to students in schools and colleges who are seeking an acquaintance with the plants of the coast, and to the more numerous group

¹ Marine Algae of the Monterey Peninsula by GILBERT M. SMITH, vii + 622 pp., with 98 plates. \$6.00, Stanford University Press. 1944.

of people who have a general interest in all that they see and a desire to learn more about seaweeds and to name them. To all of these, Prof. Smith's book should be easily and pleasantly useful.

In the introduction, many of the problems receiving the attention of students of this group of plants, and particularly the factors which affect their distribution, are treated. Here are discussed various factors, among them vertical distribution and horizontal (the latter, of course, referring to range along the coast) pointing out the importance of suitable substrata on which the plants can maintain themselves. In this connection, it would seem that a map of the Monterey region would be decidedly helpful. So also a more general treatment of the effects of temperature and of seasonal distribution would be very interesting to the general user of the book. Frequent statements show that these factors are important.

Extremely thorough and excellent is the discussion of the problems of collecting the different kinds of algae under various conditions. Unfortunately, no information is given as to the means of preservation of the material which has been collected, a point of particular interest to occasional collectors.

Especially helpful to the latter group and useful to all, is the glossary which is generally adequate and if anything errs on the side of too many definitions. But would there not be some who would appreciate definitions of such terms as parthenogenesis and whorl, and others who might question the significance of a zoospore defined as a "sport with flagella," one of the very few typographical errors occurring in the book?

Keys leading to the identification of any alga of the region are numerous and eminently satisfactory, and should make fairly easy and sure the determination of all specimens found, though it is a well-known fact that there must always be a certain number of plants that will exhibit misleading or confusing characters to baffle any collector. The numerous excellent illustrations make a decidedly helpful addition, clearly and beautifully showing the nature of nearly all the marine algae of this region.—ROY M. WHELDEN, Harvard University.

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